the Cancer Investigation Department of the Middlesex Hospital, and the Cancer Hospital for cancer investigation; £5,000 to Manchester University for general purposes, and £1,000 for the Chinese chair; £2,000 to Blackburn Grammar School for playfields, and £1,000 for university scholarships.

About thirty pictures of psychologists have been secured and reproduced for distribution by Professor E. A. Kirkpatrick, of Fitchburg, Mass., in accordance with the plan outlined in this journal some months ago.

Arrangements are in progress for a Meteorological Congress to be held in Venice in September and to which meteorologists of all countries are to be invited.

The Pasteur Institute of Paris has invited directors of similar institutes and antirabic services throughout the world to a conference on hydrophobia with special reference to etiology, prophylaxis, treatment and statistics. The conference will meet in the Pasteur Institute April 7 to 10, 1915.

Nature reports that the London School of Tropical Medicine has sent an expedition to China to study the mode of dissemination of human diseases caused by trematode parasites, especially bilharziosis, and the relation of such diseases to those occurring in domestic animals. Investigations into ankylostomiasis will also be carried on. The members of the expedition are Dr. R. T. Leiper, helminthologist of the Tropical School; Surgeon E. L. Atkinson, R.N., and Mr. Cherry-Garrard. The two last named were members of Scott's Antarctic Expedition, and the name of Surgeon Atkinson is familiar to the public as the leader of the search party which recovered the bodies of Capt. Scott and his companions.

UNIVERSITY AND EDUCATIONAL NEWS

An anonymous gift of $20,000 has been made to the library of Haverford College. The interest is to be used for the purchase of books on literature, history and art.

At the meeting of the Council on Medical Education of the American Medical Association, held in Chicago on February 24, the following colleges were given higher ratings: The University of Pittsburgh, School of Medicine; Jefferson Medical College, and the Starling-Ohio Medical College (now the College of Medicine of the Ohio State University) were raised from Class A to Class A+. The Atlanta Medical College, Atlanta, Ga., and the Fordham University School of Medicine, New York City, were raised from Class B to Class A.

At the regular meeting of the board of trustees of the University of Pennsylvania held March 9, it was decided that beginning with the session 1914–1915, all candidates for the degree doctor of public hygiene shall be required to have had identically the same preliminary education as that now demanded of those entering upon medical courses leading to the degree, doctor of medicine; that is to say, at least two years of college work plus the specified amount of physics, chemistry and biology as set forth in the University of Pennsylvania catalogue.

At Columbia University the following assistant professors have been promoted to the grade of associate professor, from July 1, 1914: Charles P. Berkey (geology); Bergen Davis (physics), and James H. McGregor (zoology). Instructors promoted to be assistant professors are as follows: Jean Broadhurst (biology—Teachers College); Clifford D. Carpenter (chemistry—Teachers College); Harold B. Keyes (physical education—Teachers College); Arthur C. Neish (chemistry); John M. Nelson (chemistry); Edward D. Thurston, Jr. (mechanical engineering); Harold W. Webb (physics); Mary T. Whitley (educational psychology—Teachers College), and Jesse F. Williams (physical education—Teachers College).

William J. Miller, Ph.D., professor of geology for the past nine years at Hamilton College, has been elected professor of geology at Smith College.

Mr. J. M. Wordie has been appointed demonstrator of petrology at the University of Cambridge.

DR. OTTO KLEMM, docent at Leipzig, has been appointed professor of psychology in Alberta University, Edmonton, Canada.

DR. KARL HESCHELER has been appointed professor of zoology and anatomy at Zurich, to succeed Professor A. Lang, who retires from active service.

PROFESSOR ALBERT BUSHNELL HART has been selected by the German government as Harvard exchange professor at the University of Berlin for the academic year 1914–15.

DISCUSSION AND CORRESPONDENCE

THE RELATIVE IMPORTANCE OF SULPHATES AND PHOSPHATES IN SOILS

IT has been demonstrated by a number of investigators[1] that the total sulphur content of soils is generally low, the amount usually not exceeding 1,000 pounds in an acre surface foot. Further, it has been shown that an equal mass of soil will contain quite as much and very often a greater quantity of phosphorus. Another fact of equal importance and which has been abundantly demonstrated is that the demands for sulphur by farm crops is not appreciably less than for phosphorus.

No one familiar with this subject would question the necessity of maintaining the supply of phosphorus in a soil, but only lately has attention been focused on the sulphur problem, placing that element in the same category with phosphorus as an element of low supply and an economic factor in crop production and permanent fertility.

On the basis of "total" analysis it appears certain that the amount of sulphur in our common soils is not larger than the phosphorus supply, and, further, that the amount brought to the surface annually in the rainfall will not compensate for the loss the land sustains by drainage.

Yet when we admit these facts we have only opened the problem of the necessity of sulphur fertilization. It is becoming rather common practise to attach a great deal of importance to the total quantity of any given essential plant food element in the soil, believing that this alone will measure or determine the permanent crop-yielding power of a given soil. For a measure of permanent crop production and for the knowledge upon which to build the soil to a certain plane of efficiency these determinations undoubtedly have value, but in the problem of continued fertilization too often we lose sight of the influence of the added material on the biological soil processes and the physiological balance of nutrients essential for the optimum growth of plants.

While it is admitted that the soil supply of sulphur is as low as the phosphorus supply, yet the question must be raised and answered—will sulphates influence crop production to the same extent as added phosphates?

It is apparent that part of the soil sulphur is in organic forms and part as sulphates, but that the organic forms are constantly being oxidized to sulphates. The additional fact that drainage waters are richer in sulphates than in phosphates must lead to the conclusion that the solubility of the sulphates in the soil water is much greater than the solubility of the phosphates. This being true, it is apparent that a lesser total quantity of sulphates in a soil would be as efficient in maintaining a sufficient sulphate concentration in the feeding zone of the plant as a much greater total quantity of phosphates.

In addition to the question of solubilities the important factor of the relative effects of sulphates and phosphates on the biochemical soil processes must be raised. Such important biochemical processes as ammonification, nitrification, nitrogen fixation, and the rate of decomposition of organic matter with its accompanying liberation of carbon dioxide can not be too greatly emphasized in deciding on the relative fertility of soils.

It has been demonstrated beyond question in certain phases of fermentology that cellular and enzymatic activities are markedly increased by the presence of soluble phosphates. Harden and Young have shown that the ac-

[1] Bogdanoff, Abstract Expt. Station Rec., 11, 723; Dymond, Hughes and Dupe, *Jr. Agr. Sci.*, 1905, 1–107; Hart and Peterson, Research Bull. No. 14, Wis. Exp. Station; Shedd, Bull. No. 174, Ky. Agr. Expt. Station.